



# Using fire to balance the tree-grass ratio

## Findings from the Wambiana grazing trial

### Why use fire?

Woodland thickening is widespread throughout Queensland due to the reduced use of fire. Declining pasture condition has also reduced grass competition, allowing trees to grow faster and thicker.

Before European settlement, Aboriginal people routinely burnt to 'open up country'. Later, graziers used fire to remove dead grass and improve feed quality.

Over the last few decades the use of fire has drastically declined, with the introduction of urea supplements allowing older, low-quality forage to be utilised. Without occasional fire, trees thicken up, reducing pasture production directly through competition.

Burning is an important tool to maintain the tree:grass balance, suppress woody plants and reduce wildfire hazard. It can also be used to reduce patch grazing and encourage more even paddock utilisation. Fire can also be a hazard reduction tool to reduce the severity or likelihood of wildfires.

Used correctly, fire can help improve pasture composition. Some 3P species, especially black speargrass (*Heteropogon contortus*) and kangaroo grass (*Themeda triandra*), are favoured by fire. In contrast, desert bluegrass (*Bothriochloa ewartiana*) appears to be neutral in response to fire whilst some wiregrasses (*Aristida*) are clearly set back. The introduced legume *Stylosanthes* is killed by fire but recovers quickly from soil seed banks.

Fire, combined with wet season spelling, can thus be used to manage stylo dominance in grass: stylo paddocks.

### 3P species

3P grasses are those which are *perennial, productive and palatable*.

### Indicators of the need to burn

Fire is an important tool when implemented correctly and at the right time of the year when pastures are dormant. Indicators that a paddock may need a burn include:

- woody thickening, especially shrubby native weeds like currant bush (*Carissa species*) and/or exotic weeds like rubber vine (*Cryptostegia grandiflora*)
- patch grazing with very short areas among rank, ungrazed pasture
- stylo-dominant pastures with declining grass yields.



**Image 1** Fire is a good servant but a bad master. Used properly it is a very effective management tool.

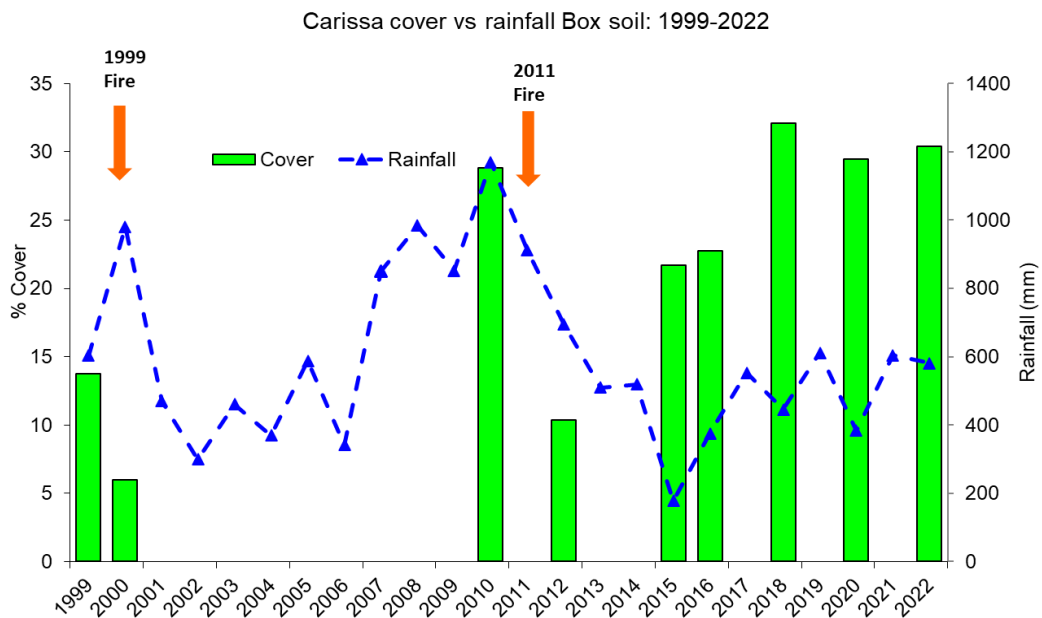
## How to use a fire

Different types of fires achieve different outcomes. A 'hot' fire is generally used to manage the tree: grass balance, whereas a 'cool' fire is used to control patch grazing and promote desirable 3P species. It can also be used to kill some thin-barked woody weeds (including Parkinsonia).

The timing and conditions of a burn will influence whether a fire is 'hot' or 'cool' more than the amount of fuel will. However, to carry a fire you need a minimum of about 1500 kg DM/ha.

A 'cool' burn is often done immediately after the first rains (storm burn) provided the grass is dormant and has not yet started fully growing. At other times, a 'cool' fire can be achieved early in the morning or late in the evening when temperatures are cooler and relative humidity is higher.

A 'hot' burn is usually applied later in the day when temperatures are high, humidity is low and fuel is very dry. In these burns, the more fuel (in terms of dry matter per hectare) the better, as the aim is to get the flames up into the woody layer (aim for >2000 kg DM/ha).



**Figure 1.** Fire is effective in controlling Carissa but unless it is regular, Carissa easily gets out of control, reducing pasture production.

Paddocks may need to be locked up for several months to accumulate enough fuel for a hot fire. However, applying moderate stocking rates should allow sufficient fuel to accumulate for burning in most years. Burning frequency will depend upon the rainfall and land type. For example, at the Wambiana grazing trial, silver-leafed ironbark areas are less tolerant of frequent fire than box land types.

To manage rank grass and promote 3P species, burn with a head fire (with the wind) at the start of the wet season immediately after about 50mm of rain (cool burn). The pasture is thus burnt before it actively

starts growing, but when there is sufficient soil moisture to drive the new season's growth. However, burning too late once the grass is actively growing will severely damage the pasture and can drastically reduce production.

## Spelling after burning

Paddocks need to be spelled after burning to ensure pastures recover before being grazed (Figure 2). Ideally, grazing would not be reintroduced until after the pasture has gone to seed. Grazing too early

reduces the energy in root reserves and can set 3P species back severely.



**Figure 2** Burnt patches in large paddocks will be heavily grazed and decline in condition unless stock are removed.

Remember, the whole paddock needs to be spelled, even if only part was burnt (for example, following a lightning strike). If not, animals will concentrate on the burnt area and can seriously damage pasture condition.

If the wet season is poor, and recovery slow paddocks may need to be locked up for the following wet season as well. \*

### Don't forget your fire permit!

Contact your fire warden to get a permit to burn before starting any fire.

*\*Learn more in the wet season spelling fact sheet.*

## How often should you burn?

The optimum fire frequency will depend on the land type and rainfall but generally should not exceed once every 5 to 10 years. Burning can be applied more often in higher rainfall regions and more fertile land types.

As a general rule, fire can be applied:

- Every 10 to 25 years on less fertile, fragile country

- Every 5 to 10 years on more productive country.

## Findings from the Wambiana grazing trial

The Wambiana trial contains a mix of brigalow, box and silver leafed ironbark land types. Research at the site shows fire will only kill between 4% and 16% of woody plants, with the number varying between species. Unsurprisingly, those killed were generally small trees (<1m). However, some very large old trees, often with hollows, were also killed.

The vast majority of trees resprout from their bases or along their main stem. This is not surprising considering Australian savannas are very well adapted to fire.

Although fire does not kill many trees, top-killing the main stem and forcing them to resprout changes the structure of the woodland, opening it out. This reduces competition and increases grass growth. Importantly, it suppresses woody species and keeps them short enough to control with fire (the 'fire trap').

If most trees are kept below 2m or 3m they can still be top-killed with fire, forcing them to regrow from their bases. Above this height, fire will have little or no effect. This was found at the Wambiana trial with some young Brigalow and ironbark trees rapidly growing up above fire height before they could be controlled.

While fire also caused complete top kill of the native woody weed Currant bush (*Carissa ovata*), it regrew to its former levels within 5 or 6 years (Figure 1). More regular fire is thus needed to keep *Carissa* under control and stop its spread.

## Tips for using fire

Avoid burning when seasonal forecasts for the approaching wet season indicate below average rainfall. Consult seasonal forecasts such as those from the Bureau of Meteorology.

Remember, use fire with caution. "*Burning is a good servant but a bad master.*"

## Burning guidelines

- Contact your local fire warden for training:

[qfes.qld.gov.au/about-us/frontline-services/rural-fire-service](https://qfes.qld.gov.au/about-us/frontline-services/rural-fire-service)



- Queensland Fire and Emergency Services provides information on obtaining permits and preparing for a fire.
- Plan ahead to ensure there is enough fuel for the type of fire desired and there is sufficient forage in other paddocks so they are not overgrazed.
- Know your weather conditions for the burn and post-burn: [bom.gov.au](http://bom.gov.au)
- Does your property border a national park? If so, contact the Queensland Parks and Wildlife Service.



**Figure 3** The same monitoring site at the Wambiana trial over 20 years. Left: the site in 2001 after being burnt in 1999. Right: The same site in 2021. Despite a second fire in 2011 the Brigalow suckers had outgrown the fire trap and are now largely beyond the reach of fire.

### More information

Contact your local extension officer for more advice on using fire to manage your country.

[Futurebeef.com.au/contact-us/](http://Futurebeef.com.au/contact-us/)